DEPARTMENT OF STATE LANDS

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October 26, 1994

Dear Reader:

Enclosed for your files is an environmental assessment (EA) which evaluates actions proposed at the Beal Mountain mine involving continued mining followed by pit backfilling and reclamation. The proposed revision would extend mining by approximately one year; pit backfilling would further extend the period of employment at the mine. This EA was prepared by the Montana Department of State Lands.

WJ/rhv

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CHECKLIST ENVIRONMENTAL ASSESSMENT

Company Name: Beal Mountain Mining, Inc. Project: Beal

Operating Plan #: 00135

Type and Purpose of Action: Extended mine life; deepening of existing pit and subsequent backfilling to previously permitted elevation

Reclamation Plan: unchanged

Location: Six miles southwest of Fairmont Hot Springs County: Silver Bow

Summary of Proposed Revision:

The revision involves deepening of the existing pit by 100 feet and raising the height of the leach pad by approximately 15 feet. For pit reclamation, BMMI would partially reduce the pit highwall (in the Beal shear area) and partially off-load the existing waste rock repository. After moving rock from the Beal shear zone into the pit, neutral waste rock from the South Beal area, which is currently stockpiled on the waste rock repository, would be used for the remaining pit backfill. Backfill would be placed into the pit in thin (5 to 10 foot thick) layers to assure a low permeability and prevent subsidence. A layer of coarse drain rock would be placed above the backfill to allow groundwater inflows from the pit highwalls to pass through without surfacing. Five to ten feet of compacted capping material would be placed over this drain layer to prevent infiltration of storm water. Stormwater would be controlled on the surface using best management practices. No other mining or reclamation procedures would be changed as a result of this revision.

Project History:

The Beal mine was permitted in July of 1988. Mining of ten million tons of ore and 6.4 million tons of waste rock was anticipated. The mine was projected to operate for ten years, but accelerated rates of mining shortened the duration of the original project by about four years. Operating permit #00135 has been amended twice. In August of 1992, BMMI received approval to construct a haul road on the south side of German Gulch. This revision resulted in less disturbance and a shorter haul distance than the previously approved road location, and also prevented destruction of a stand of old growth timber. In July of 1993, BMMI received approval to mine a small ore body (the South Beal deposit) on the south side of German Gulch. That project, which will be completed during the fall of 1994, will add approximately 1 million tons of ore to the leach pad, and has extended the mine's life by one year. The revision currently under consideration would also add approximately a million tons of ore to the leach pad, for a total of 12 million tons. The pad was originally designed with a capacity of approximately 16 million tons. BMMI is not proposing expansion of the main Beal pit to fully load the leach pad to 16 million tons.

In July of 1988, mining of the main Beal pit to the elevation of German Gulch (el. 6920') was permitted. This will result in post-closure discharge of stormwater and groundwater from the pit toward German Gulch. Under the permitted plan, mineralized rock of the high grade ore zone would be left exposed at the 6920 level, with a soil cover.

Under BMMI's plan to deepen the pit, this mineralized rock would be removed from potential contact with water which would discharge from the pit. The backfilling would replace the mineralized rock with non-acid-producing Beal Shear and South Beal rock. The revision analyzed in this Environmental Assessment would not modify the predicted flow path of stormwater or groundwater. For more background information on the Beal mine, the reader is referred to the following documents:

Preliminary Environmental Review, Beal Mountain Mining, Inc., Beal Project; July 1988;
Final Environmental Impact Statement, South Beal Project; June 30, 1993;
Update for Operating Permit #00135, Beal Mountain Mining, Inc.; February 1994;
Beal Extension Application, Beal Mountain Project; July 1994

N = Not present or No Impact will occur.
Y = Impacts may occur (explain under Potential Impacts).

IMPACTS OF THE PROPOSED ACTION ON THE PHYSICAL ENVIRONMENT	
RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are soils present which are fragile, erosive, susceptible to compaction, or unstable? Are there unusual or unstable geologic features? Are there special reclamation considerations?	[Y] The proposal would not affect soils, as no new disturbance area is required. There is a slump block in the north highwall of the pit (the Gully Fault slide) which is currently being removed by BMMI. The area above the slump is being buttressed as the sliding block is removed. The toe of the slide is above the existing pit floor, therefore, no increased instability is anticipated. Dewatering during mining would further reduce the risk of further stability problems over the short term, and backfilling would maintain long-term stability at current conditions. The cell of the leach pad nearest the slump block is no longer active, and no more ore would be added to this section of the leach pad. Therefore, ore from this expansion will not affect stability of the leach pad. Special reclamation considerations (engineered backfilling of the portion of the pit proposed for deepening) are intended to prevent impacts to the quality of water in German Gulch, and are discussed below under #2 as well as in the summary on page 1.
2. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?	[Y] As noted above, German Gulch is an important surface water resource. Past activities at the Beal mine have resulted in degradation of water quality in German Gulch. Degradation is limited to increases in concentrations of the following parameters: nitrate, sulfate, and selenate. The primary source of these anions is seepage discharging from the toe of the waste rock repository. The discharge is known as "Spring 5." The nitrogen is derived from a combination of sources, including fertilizer used on reclaimed areas and blasting agent (ANFO) residue on waste rock. The sulfur and selenium occur naturally within the rocks of the region. Fracturing of the rock as a result of mining accelerates weathering of the rock and release of these elements. In response to these changes in water quality, BMMI constructed a capture system which prevents most of the seepage from entering German Gulch. Also, BMMI has improved water diversions above the repository; this has reduced the quantity of water discharging from spring 5. In addition, BMMI is installing drains beneath the waste rock which may prevent the interaction of groundwater with the rock. If these measures are successful, degradation may cease. Deepening the pit would not increase the amount of rock in the waste rock repository; therefore it can not influence German Gulch through this potential pathway.

2. Continued	The proposal would increase the load of ore on the leach pad by about 9%. The leach pad liner prevents seepage of water from the ore into groundwater. In addition, the leach pad is located on a ridge top away from all surface waters. Therefore, ore mined during this project would not be expected to impact surface or groundwater resources. The reclamation/backfilling designs proposed in this revision (use of compacted non-acid-generating and neutralizing rock for backfill) would be intended to prevent impacts to the quality of water in German Gulch, which is a high-quality trout stream. In July of 1988, mining of the pit to the elevation of German Gulch (el. 6920') was permitted. Mining to the 6920' level results in post-closure discharge of stormwater and groundwater from the pit toward German Gulch. The quality of water which would discharge from the pit after closure as a result of deepening the pit followed by engineered backfilling would likely be similar to or better than the discharge which would result from implementation of the currently approved reclamation plan. The sources of effluent from the pit will be stormwater runoff from the pit floor and highwalls, and groundwater discharge from the pit highwalls. Pit deepening and subsequent backfilling would not influence the chemistry of water from these sources. After mining ceases, the backfill is expected to become saturated by groundwater inflow. Use of clean material as fill would preclude water quality impacts resulting from the interaction of the fill with groundwater. However, the combination of the reduced permeability of the compacted fill and the constructed high permeability drainage layer, which is proposed to route groundwater inflows from the highwall over the fill, would restrict discharge of water from the backfilled rock. Water retained in the fill would therefore have little impact on adjacent water resources, regardless of its quality.
3. **AIR QUALITY:** Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I air-shed)?	[N] Impacts are no different than those permitted under the current air quality permit
4. **VEGETATION COVER, QUANTITY AND QUALITY:** Will vegetative communities be significantly impacted? Are any rare plants or cover types present?	[N]
5. **TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:** Is there substantial use of the area by important wildlife, birds or fish?	[N] The Beal mine is located adjacent to the Haggin Wildlife Management Area of the Deer Lodge National Forest, and is important elk habitat. As noted above, German Gulch is an important Cutthroat trout fishery. Impacts of the proposed action are no different than existing impacts. The proposal would extend mining activity in the area by approximately one year.
6. **UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:** Are any federally listed threatened or endangered species or identified habitat present? Any wetlands? Species of special concern?	[N]
7. **HISTORICAL AND ARCHAEOLOGICAL SITES:** Are any historical, archaeological or paleontological resources present?	[N]

8. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light?	[N] The leach pad is located on a ridge, but the addition of one extra 15-foot lift would not be noticeable.
9. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project?	[Y] Reserves of neutral waste rock within the existing mine pits is limited. The project would use all of this material as pit backfill. The quantity of ore to be mined would be restricted by the quantity of suitable backfill available.
10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES: Are there other studies, plans or projects on this tract?	[N]

IMPACTS ON THE HUMAN POPULATION

RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
11. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[N]
12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[Y] The project would prolong mining industry activity in this region by approximately one year.
13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so, estimated number.	[N] The project would maintain existing mining and vending jobs for an additional year.
14. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue?	[Y] Tax revenue would be created.
15. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc) be needed?	[N]
16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	[N] These plans would remain unchanged by the project.
17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract?	[N] The project would not affect current recreational uses.
18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing?	[N] No change in employment is proposed.
19. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities possible?	[N]
20. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	[N]
21. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:	[N]

22. Alternatives Considered:

No Action: The project is preferable to the existing mine reclamation plan because the mineralized zone would be buried with clean backfill rather than left near the surface.

Approval: Recommended as proposed.

Alternatives considered for pit reclamation:

1. Backfill pit to near original contour: BMMI has already proposed to backfill the zone proposed for mining under this revision to the previously permitted mining level of 6920'. This provides for a free-draining pit. In the South Beal EIS, approval was given for BMMI to backfill, soil, and revegetate the South Beal pit.

Additional backfilling of the main Beal pit would be unnecessary because it would require re-disturbance of the waste rock repository, which is already largely reclaimed. Soil already spread on the waste rock repository would be lost. Both the footprint of the existing waste rock repository and the backfill would then have to be re-soiled, which would require a significant reduction in soil replacement depths due to the increased area. The waste rock repository is geotechnically stable, and does not need to be moved. Recent diversion and drain construction is isolating the waste rock repository from groundwater and surface water inflows, which will lessen impacts to German Gulch. If the waste rock is placed back into the pit, it may re-saturate, resulting in resumed degraded seepage.

2. Partial Highwall Slope Reduction (Blasting and/or Regrading): Upper portions of the Main Beal pit highwall are being regraded during removal and buttressing of the Gully Fault slide. Remaining highwalls in this pit are to be left as cliff areas, which may provide raptor habitat. Under this revision, the south highwall of the Main Beal pit would also be reduced as a result of removal of the Beal Shear material for use as backfill.

3. Complete Highwall Slope Reduction: Complete highwall slope reduction would greatly increase the disturbance area. Furthermore, the heap leach pad is located above the pit highwall. Complete reduction of the north highwall would undermine the leach pad, and there is no other suitable place to relocate the ore on the pad. Therefore, highwall slope reduction is not feasible beyond what is already proposed (see #2 above).

4. Reclamation to Lake: If the pit were not backfilled, the pit would slowly flood and a lake would develop. The quality of water in such a lake would depend upon rate of flow through the lake and geochemical reactivity of rock in the pit walls. The water chemistry of such a lake at Beal has not been predicted; predictions of this nature are difficult to make. BMMI could choose to allow the pit to flood, or with their water right could divert up to one cubic foot per second from German Gulch into the pit and study water chemistry as the pit fills. If its quality is acceptable, the Beal pit lake could make an excellent recreational site where none currently exists; it could also function as trout habitat. If the quality were not acceptable, the water in the pit could be drained and irrigated onto the land, either on Beal's Hill or downstream in the Silver Bow Creek valley. The pit would then be backfilled according to plan. BMMI is encouraged to consider this option prior to commencement of backfilling.

23. Public Involvement: Public notice is not required for a minor revision to an existing operating permit as per 82-4-353 MCA.

24. Other Governmental Agencies with Jurisdiction:

Federal: USFS Deer Lodge National Forest: The pit is on private, patented land, and is outside the jurisdiction of the USFS. DLNF has already given BMMI approval to proceed with the proposed expansion.

State: MDHES Water Quality Division: BMMI has submitted an application for an MPDES permit to the Department of Health and Environmental Sciences; this application is currently under review.

25. Magnitude and Significance of Potential Impacts:

Potential environmental impacts from the proposed revision do not differ significantly from those of the existing, approved project.

26. Cumulative Effects:

Cumulative effects would be similar to existing effects. Specifically, concentrations of nitrate, sulfate, and selenate in seepage below the waste rock repository may remain higher than prior to mining. If of sufficiently high concentration, nitrate will result in increased growth of algae in the stream. Changes in sulfate concentration similar to those observed in German Gulch prior to diversion of Spring 5 are not expected to have any effect. Selenium concentrations were above aquatic life standards for a long time prior to diversion of Spring 5, but impacts to the trout population were not observed. Trout seem to have migrated farther upstream (closer to the mine) than they had been observed prior to mining by BMMI.

Continuing improvements in diversions, sediment control structures, etc, by BMMI are currently reducing impacts to German Gulch from the mine. If the trend continues, cumulative effects may be expected to be less than current impacts.

Recommendation for Further Environmental Analysis:

[ ] EIS [ ] More Detailed EA [X] No Further Analysis

EA Checklist Prepared By:	Wayne E. Jepson Signature	DSL Hydrogeologist Title	10/26/94 Date
Approved By:	Robert C. Winegar Signature	Program Supervisor Title	10/26/94 Date